

A Level Computer Science

Exam Style Questions

Unit 1.4.2

Data Structures

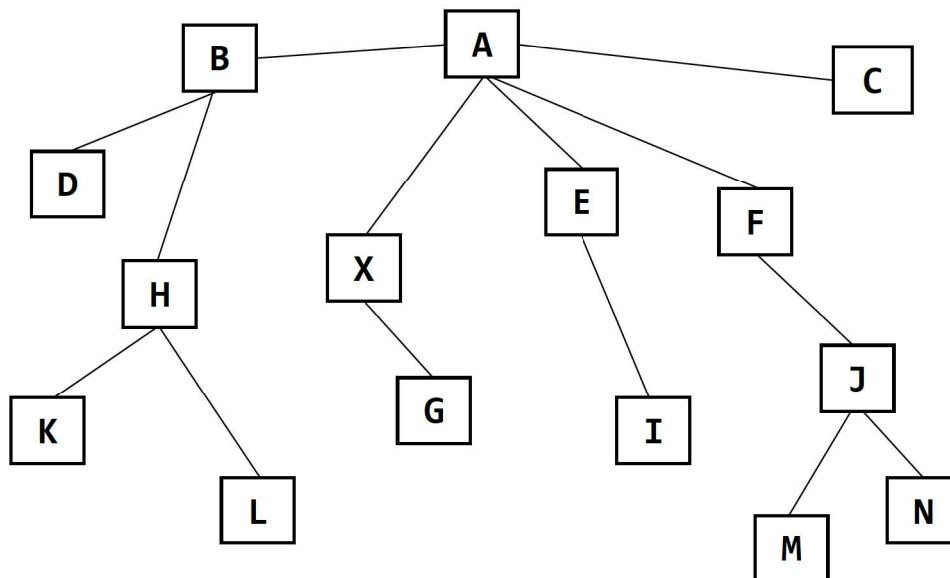
Graphs

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Score	Percentage	Grade
/ 20		

Question 1

A data structure is shown below in the diagram below.



- a) Identify the data structure shown above

[1]

- b) The programmer is considering using a depth-first (post-order) traversal, or a breadth-first traversal to find the path between node A and node X.

Explain the difference between a depth-first (post-order) and breadth-first traversal.

[4]

- c) Show how a depth-first (post-order) traversal would find the path between node A and node X for the structure shown in the diagram above.



[6]

- d) Explain how you used backtracking in your answer to part c).



[3]

Question 2

- a) Describe what is meant by a graph structure.

[2]

- b) The pseudocode below shows part of an algorithm which uses a queue to traverse a graph breadth-first. Complete the missing elements of the algorithm.

```
markAllVertices (notVisited)
start = 
markAsVisited(  )
pushIntoQueue(start)
while QueueIsEmpty() == 
    currentNode = removeFromQueue()
    while allNodesVisited == false
        markAsVisited(  )
        // following sub-routine pushes all nodes connected to
        // currentNode AND that are unvisited
        pushUnvisitedAdjacents()
    endwhile
endwhile
```

[4]